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ABSTRACT

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PSYCHOPATHOLOGY IN CHILDHOOD AND ADOLESCENCE AS REFLECTED IN PROJECTED AFTERIMAGE SERIALS

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PSYCHOPATHOLOGY IN CHILDHOOD AND ADOLESCENCE AS REFLECTED IN PROJECTED AFTERIMAGE SERIALS

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Summary: Administered a serial visual afterimage (AI) test to 136 normal and 75 anxiety-ridden children 4 - 16 years of age. The scoring of the AI serials involved signs of primitive functioning (size-constant and positive AIs), anxiety (large and dark AIs together with primitive AIs in older children) and process discontinuity (intermittent regressions to small, positive, or physiognomic AIs). Differences between normal and clinical children were generally highly significant in these respects. Special attention was directed to the difference between subjects with intermittent regressions to primitive functioning and subjects where regression represented a lasting functional alternative. The former subjects were more often characterized by paroxysmal or primary anxiety.

In order to comprehend how visual afterimages (AIs) could be of any value as instruments for personality description we have to analyze in some detail the place of the AI phenomenon in the individual's field of experience. The problem area is not entirely new as attested by many publications from the early part of this century (Kroh, 1922; Jaensch et al, 1929, 1930; Vujić & Levi, 1939). However, when the present authors and their collaborators took up the topic a few years ago (Andersson, Nilsson, Ruuth, & Smith, 1972) the field had been practically silent for many decades.

As a convenient starting-point for a presentation of the problem, let us divide the phenomenal world of an individual into two poles, the self and the nonself (cf. Andersson, Jo-

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hansson, Karlsson, & Ohlsson, 1969). This polarization of our experiences into what belongs to us and what belongs to an independent outside world undergoes a series of changes during ontogenesis. Following Piaget (e.g., 1955; Piaget & Inhelder, 1969) we may distinguish between three stages in the child's cognitive development from about 4 years of age: (1) An early pre-operational stage with fragmentary "internal representation" and a still rather diffuse differentiation between self and nonself. (2) A later stage where thought becomes more separated from action, and the self more clearly set off from the nonself, but where internalized actions are still tied to perceptual rather than cognitive criteria, where the perspective is egocentric and the nonself therefore dominated by the self. (3) The stage of concrete operations where perceptual appearances no longer dominate over thought processes and the egocentric perspective is replaced by a more relativistic one.

Following Heinz Werner (1948) rather than Piaget we would like to add that the optimal cognitive level at which an individual is capable of functioning (during his present developmental period) is not arrived at once and for all but has to be attained again in each new encounter with the outside world. The adaptive process by means of which this mastery is reached may eventually become more and more abbreviated and mechanized. When confronted with unexpected and difficult circumstances the individual might once again regress to modes of experience and forms of behavior which belong to his early, even very early past. Normally such regressions are only partial and quickly overcome. Under severe conditions they may be lasting and pathological.

The processes effecting an individual's adaptation to the momentary requirements of the outside world are particularly useful as mirrors of the relation between his self and nonself. In our own research program over the years we have paid particular attention to such processes, called by us <u>percept-genetic</u> (PG) processes by us, and have constructed special methods to make possible an analysis of how they unfold over a rather brief time span (the operational present). One of these methods is centered around visual AIs which are

projected on a screen by the subject over a series of trials. Visual AIs have been rewarding to us because of their ambiguous position in the phenomenal world, "presenting themselves" rather vaguely in the region between the self and nonself poles of experience.

Among the results presented in our previous work with AIs a few ought to be mentioned in this context. When the relation between the self and the nonself is still undeveloped the child can hardly produce any AIs at all. At this stage he does not even understand what, for instance, Piaget's Landscape Task is all about and obviously belongs to stage 1 as defined above (Smith & Danielsson,1977a). At the next stage the child is well able to project AIs and to measure their size on a screen. Lacking an outside perspective of its own self the child, however, sees the AI as an integral part of the outside physical world; hence the AI is likely to retain the color of the initiating stimulus and to increase very little in size relative to the projection screen when the projection distance is prolonged (Ruuth & Smith, 1969; Ruuth & Andersson, 1971; Smith & Nordström, 1975). Not until the post-egocentric stage does the mature AI appear, the well-known negative image changing in size with the projection distance.

However, AIs should not only be viewed in a limited cognitive perspective. Since AIs are part of our experiential world they may be emotionally colored. In other words,even the adult AI cannot merely be regarded as the mechanical result of certain conditions pertaining to the stimulus and projection surface. In individuals suffering from manifest anxiety, for instance, we have shown how AIs become dark, even frightening, and/or cover an increasing part of the perceptual field (Smith & Kragh, 1967; Smith, Sjöholm, & Nielzén, 1976). It has also been demonstrated that when anxiety is curbed by depressive retardation AIs are likely to gradually diminish and lose their darkness over the experimental serial (Smith, Kragh, Eberhard, & Johnson, 1972; Smith & Danielsson, 1977b). Alternatively, in compulsive subjects the dark color of anxiety may be blocked by certain subtle shifts of hue (from blue or blue-green to clearly green in the present stimulus situation)

which make it difficult for the AI to become oversaturated, achromatic and black (Smith, Fries, Andersson, & Ried, 1971; Andersson, Fries, & Smith, 1970).

AIs are made to reflect an adaptive process because the experimenter repeats the initiating stimulation and requires the subject to project a new image after each stimulation. If administered with a sufficient number of trials such a serial AI experiment is supposed to make possible optimal adaptation of each individual to his AI phenomenon. The early phases in the experiment are, then, more likely to reflect adaptive stages "left behind" by the individual, i.e., which are no longer part of his habitual self. The AI process thus reproduces the hierarchical stratification of the individual's experiential world. An AI serial initially characterized by very primitive images may very well produce mature images at later stages, but the very presence of many immature AIs may suggest a potential risk for regressions if the adaptive task is made difficult for the individual.

Diagnostic work utilizing AIs is based on the assumption that, eventually, the perceiver is going to conceive of them not only as phenomena emanating from his own self but from a very periferal part of the self, an isolated sense organ. The AI process, in that case, will end up with an image reflecting the stimulus and projection situation in a predictable, "physicalistic" way. If the preceiver, be he a child or an adult, is given a different theory about the "true" nature of AIs this balance is likely to be disturbed however. It has been possible, by means of theoretical manipulations, to produce childish AIs in adult subjects or AIs emotionally colored in a certain way (Smith & Sjöholm, 1974b). However, given the prevailing scientific outlook on the world, the natural end-product of the AI process in adults is obviously the image described in conventional textbooks.

In previous studies we have let AIs reflect adaptive processes in normal and pathologically disturbed adults. More recently we have also worked with normal children 4-15 years of age (Smith & Nordström, 1975; Smith & Danielsson, 1977a). A special study reported how the presence of depression in chil-

dren implied, as just mentioned, that the size of their AIs diminished from trial to trial in the AI experiment. The present paper aims at further analysis of the AI processes in this same group of patients 4-16 years of age - but from slightly different points of view. Since these children were mainly characterized by manifest anxiety we plan, first of all, to trace signs of anxiety in their AIs, but we shall also scrutinize closely allied signs of primitive functioning and psychotic discontinuity. We have done some work in these fields before and have quite specific hypotheses which will be spelled out in their proper context below.

Method

Subjects

The clinical group consisted of 75 subjects (45 boys and 30 girls) 4-16 years of age and the normal group of 136 subjects (61 boys and 65 girls) aged 4-15. Using the well-known Landscape Test of cognitive ego-centricity (Piaget & Inhelder, 1941, 1956) the children in each age group were characterized as either mature or immature. The younger the children were, the more decisive was the cognitive task for their placement in these subgroups (for details, see Smith & Danielsson,1977a). The 11-year-olds were divided in three groups, the most mature ones (with no landscape errors) being included in a group together with those aged 12-13. Preschool children (<7 years old) were divided in 5 subgroups: 3b includes children ≥5 years old who made no errors, and 1a-1b consist of children <6 years old with either no comprehension of the task at all (1a) or an incorrect answer even with regard to their own perspective (1b). Groups 2a- 3a were 5-6 years old. Most of these children comprehended the task but still made one or more errors.

An overview of the subjects can be gained from Table 1. The preschool children will concern us little here since few of them could produce acceptable AI serials. Among the two oldest age groups shown in the table, some clinical subjects were unable to give completely correct answers to the cognitive task. These subjects, who have no counterpart in the normal group, will be treated separately in most comparisons below.

Among the younger school children, 12 are immature and 15 mature in the clinical group as compared with 19 and 17, respectively, in the normal group. This slight intergroup difference will tend to work against our hypothesis.

The clinical children were all patients at a children's psychiatric clinic and were selected for testing if they showed symptoms of anxiety. No children suspected of brain disfunction were accepted. The normal children were taken from ordinary schools and nursery schools and the age groups were matched with respect to sex and social background.Children who were or had been in contact with mental health boards were not included. Refusals to participate were rare in both groups.

The Afterimage Test

The AI apparatus consisted of a semi-transparent ground Plexiglas screen 23.5 × 23.5 cm, movable along two horizontal bars. Two markers at the front of the screen could be moved independently of each other by means of two levers.The subject pulled the levers towards himself to measure the width of the AI.

The stimulus was projected from behind the screen,and the subject viewed it through a tight-fitting eye-piece. The room was faintly illuminated (ca. 1.4 lux at the screen). The stimulus was a relatively intense (ca. 50 lux) red figure with straight sides and with rounded contours at the top and bottom. It had two eyes and a sad mouth schematically drawn in black. A black fixation point on the screen coincided with a nose.The width of the stimulus was 5.5 cm. The subject fixated it for 20 sec. The fixation distance was 39 cm and the projection distance 59 cm. The expected Emmert size of the AI was thus 8.3 cm. (The red color of the stimulus figure can be defined by the transmission values of the color filter: 20% at wave-length 3800, close to 0% at 4500-5500, 50% at 6000, and 90% at >6500, and the make of the projector lamp: Philips 6158 N/05, 100W, 230V).

The brightness of the AI is usually judged on a ten-point scale. To guide this intensity estimate, light and dark fields are exposed on the screen before the red face is shown. These

fields are supposed to serve as anchor points and are called 1 (light) and 10 (dark). However, subjects are also allowed to use one additional step (>10) in case the dark field seems insufficiently "black" to them. In the present sample many children could not quite understand how to use such a rating method. They were therefore asked to give a more crude estimate (bright - medium - dark) of AI brightness (with particular attention given to the dark end of the scale) together with their description of color and general appearance.

In order to extinguish the AI, a diffuse red light was exposed for 5 sec after each trial.

Sixten trials usually comprise a series for adult subjects because after 16 trials AIs do not continue to change appreciably. Our subjects, particularly the younger children, could hardly be forced to endure such a long and trying session. Accordingly, the number of trials was cut down to ten. The time required per trial was about 70 sec.

Children suspected of color blindness were tested with the H-R-R Pseudoisochromatic Plates.

The scoring dimensions will be presented in detail below.

The clinical symptoms

The clinical children were rated with respect to the presence or absence of a number of symptoms. This rating relied on information from members of the clinical staff and was performed independently of the test scoring. In our disposition of anxiety dimensions we have relied on, among others, Anthony (1975a). The following dimensions will concern us here.

Paroxysmal anxiety: acute attacks of anxiety, panic,other sudden and uncontrollable outbreaks, feelings of oncoming disaster.

Chronic anxiety: a chronic state of high tension, several somatic symptoms or particularly severe symptoms such as persistent food refusals, vomiting, etc., anticipation of something unpleasant or other apprehensions or "worries".

Focussed anxiety: unnecessary fright of particular persons or situations (including phobias as well as pseudo-phobias).

More diffuse anxiety reactions: minor somatic symptoms

such as sleep disturbances, enuresis, nail biting, clawing, stomach upsets, etc.

We also noted signs of cognitive disturbances in the subject's contact with reality.

Certain signs of paroxysmal anxiety and of disturbed contact with reality were comparatively rare in the clinical group. Therefore we also accepted slightly uncertain signs as indicative of the presence of this form of anxiety or disturbance.

The Meta-Contrast Technique (MCT)

This technique makes possible a reconstruction of how a new percept develops within the framework of a stabilized percept, a development normally supposed to occur over micro-time. The use of a threatening or incongruent picture to initiate the development of a new percept is meant to facilitate reactions of anxiety and, as a consequence, defense against anxiety. The test as used with children has been described in detail elsewhere (Smith & Nordström, 1975; Smith & Danielsson, 1977a).

Only a few scoring dimensions will concern us in the present study. In order to comprehend them it is necessary to know that the MCT involves tachistoscopic presentation of pairs of stimuli (A and B) in two series. Stimulus A in one of these depicts a threat directed against a young person (hero) in B. B is first presented at 0.01 sec., then at gradually increased exposure steps until it has been identified and, finally, it is presented at a standardized exposure level in a control series. Without the subject's knowledge, the experimenter thereafter introduces A immediately before B at 0.01 sec. While the exposure time of B is kept constant that of A is gradually prolonged until A+B have been correctly reported. Subjects are instructed to describe everything on the projection screen after each exposure.

Conventional signs of severe anxiety: (a) the threat (A) and the hero (in B) are seen close together, are fused with each other, etc.; (b) the defensive structures are "leaking" anxiety as, e.g., when an "isolating" subject sees a curtain

covering the area in B where A is being projected but, at the same time, senses something dangerous behind the curtain; (c) at least two zero phases, i.e., reports where nothing or only a chaos is perceived by the subject; (d) open fright expressed in the test situation; (e) reports of broken structures, of a picture falling to pieces, etc.

Open anxiety or feelings of oncoming disaster: signs of type (d) and (e) above were chosen to represent this dimension. Because of the relative scarcity of these signs we have also accepted slightly marginal signs.

Discontinuities: (a) grave projections, i.e., reports of considerable change in B (under the influence of a still subliminal A) which are apt to endanger or actually break the continuity between the present report and the preceding one; (b) at least two zero phases; (c) B being generally unstable or reported as different although the difference is never defined - signs accepted only in combination with at least one zero phase.

Eye-shutting behavior: the subject shuts his own eyes, turns his head away, etc., when presented with the stimuli, an open and direct defensive reaction typical of the normal preschool children, except subgroup 3b.

Primitive functioning

On the basis of pilot studies, it could easily be predicted that the AIs of clinical children ought to show more primitive stigmata than those of normal children. Since we have tried to match the comparison groups with respect to performance in the Landscape Test, such a result could not possibly be explainted with reference to the most basic cognitive skills available to the subjects. The relative immaturity of the clinical children should rather be viewed in a broad functional-emotional perspective as lack of articulation of their sense of self in relation to outside reality. In other words, the AI serials of these anxiety-ridden children were expected to reveal that they do not function at levels of self-articulation congruent with their age and dormant cognitive ability but prefer to regress to the relative ease and safety of more in-

fantile levels, especially when confronted with a new adaptive task.

Scoring

In previous AI studies primitive characteristics have been scored in the dimensions of size, brightness and color. Since the use of the brightness scale was rather crude in many clinical subjects, emphasizing the dark end more than the light, "positive" one, we limit our scoring to size and color. (Very bright, achromatic shades have always been scarce anyhow). AIs are thus considered as primitive if they are reasonably constant in size ($\leq$6.5 cm) and/or positively colored (red, brown,yellow,reddish violet). We have noted the presence of at least two small or two positive AIs in a serial. Some subjects see nothing but primitive AIs;they are too few to form the basis for statistical comparisons. Instead, we have listed subjects totally devoid of negative-chromatic (blue,blue-green) AIs.

Results

There are many significant differences between clinical subjects and normal ones in Table 1. Normal preschool children

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Table 1.

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belonging to subgroups 2a-3b are fairly successful in producing AIs whereas the corresponding clinical children are not. At school level differences in the proportion of subjects with small AIs are particularly significant. Adding all subgroups except cognitively immature subjects from the age of 12 years upwards we find 29 clinical subjects with at least 2 small AIs and 20 without. The corresponding figures in the normal group are 11 and 57 (χ^2 = 23.41, df = 1, P <0.001, two-sided test; calculations of exact probabilities for each age group also yielding significant values).With the proportions in the normal group remaining the same we find 26 clinical subjects completely devoid of negative-chromatic images (χ^2=19.89; exact P vaules for the two oldest age groups being separately significant).It may be added that the most common size deviations among the

above clinical subjects are in the direction of small AIs as compared with large (≥ 11.0 cm) ones: 16 subjects are scored for small AIs only, 13 for small as well as large ones, 3 for large AIs alone.

Comments

The first question to ask in relation to Table 1 would probably be why the color difference between the groups did not concern presence of positive color as much as abscence of negative hues. In a typical normal AI protocol with positive AIs one is also likely to find negative AIs. In a clinical protocol one finds rather a mixture of positive and achromatic hues or only the latter kind of shades. If we consider achromatic shades as a compromise between positive and negative tendencies we may very well label achromatic AI serials as immature. It also seems likely that in children with manifest anxiety the darkness of the AI (see below) will tend to render color discrimination particularly difficult and tempt them to report only the darkness of the AI.

The higher frequency of truncated AI serials in the clinical group is not a very original finding. However, relating it to previous findings in adult subjects (Smith & Sjöholm, 1974a) we may consider it a sign of anxiety - and the only such sign supplied by the AI test in our young and immature clinical subjects. Children with symptoms of anxiety are generally more agitated and less patient, have greater difficulties in fixating the projection screen, are more often frightened of the AI phenomenon itself, are more uncertain about how to define AI in relation to themselves and physical reality, etc., all circumstances rendering it difficult for the child to behold the AI for inspection on the projection surface.

Anxiety

In the previous study of normal school children (Smith & Nordström, 1975) we used a number of anxiety signs adapted from work with adults and pertaining to the size and darkness of the AI. Since we made it a point not to score large AIs in serials which might reflect a generally unstable self-nonself

relation rather than manifest anxiety we excluded serials containing size-constant AIs. Because of the sizeable number of clinical serials with one or more small AIs we decided to consider large AIs in all serials. The previous use of primitive AIs as a sign of anxiety in more mature subjects was motivated with reference to a factor-analytic study of adults (Smith, Fries, Andersson, & Ried, 1971) where the anxiety factor was found to be highly loaded with primitive signs. As said above, truncated serials are also likely to reflect anxiety. Among the severe anxiety signs in the MCT listed above were zero phases, particularly in children ≥ (11)/12 years old. Analogous signs in the AI test would be so-called real regressions to small or more physiognomic AIs (for a detailed description, see the next section). We omitted color regressions (because some color reports in the normal group, tested several years ago, proved too ambiguous to be exploited for the present purpose) and brightness regressions (because many clinical subjects did not use the quantitative brightness scale).

Scoring

1. Old anxiety signs: (a) at least 3 AIs ≥ 10.5 cm in serials without size-constant (≤ 6.5 cm) AIs; (b) at least 2 AIs estimated on the brightness scale as ≥ 10 or described as dark/black like the dark end of the scale; or instead of one such AI 2 achromatic AIs estimated as 9, or 3 chromatic AIs estimated as 10, or 2 large AIs.

2. New anxiety signs: signs 1a in serials with AIs which are constant in size.

3. Primitive signs: at least 5 positive AIs and/or AIs which are constant in size in subjects at the two upper age and maturity levels.

4. Truncated serials: at least 3 phases totally lacking.

5. Regressions: at least 1 real regression (see next section) from a mature AI level to an immature one (color and brightness regressions not being considered) in subjects at the two upper age and maturity levels.

Results and comments

The immature clinical subjects belonging to age levels 12 and above have been omitted from Table 2, likewise the preschool

Table 2

children (the only characteristic of most clinical preschool children being their inability to produce AIs). Not considering the incomplete AI serials in column 5 we find 38 clinical subjects with anxiety signs and 11 without, compared to 30 and 38 normal subjects, respectively ($\chi^2 = 13.08$, df = 1, $P < 0.001$, two-sided test). With the incomplete serials included the χ^2 value increases to 15.16. Scoring category 3, regression, plays a subordinate role here. Understandably, the difference between the normal and clinical groups seems to be least marked around puberty. Regarding the more pronounced difference at the age level just below (subgroup (11)12-13 years) we would like to return to Table 1 where 10 of the 17 subjects in the normal group were scored for green color but only 1 in the clinical group of 11 received this score ($P = 0.02$, Fisher's exact test, two-sided). As mentioned in the introduction, clearly green color reported in the present experimental situation is likely to be a sign of isolating defense. This is compatible with the description of the normal latency child as "a mildly obsessive child whose compulsions are very likely to pass with the onset of puberty" (Anthony, 1975b, p. 372). Children with manifest anxiety obviously lack the benefit of this normal defense.

In order to inquire more closely into the power of the signs used in Table 2 we have tried to divide the clinical subjects with respect to the type of anxiety symptoms observed in them: cases with paroxysmal or chronic anxiety, on the one hand, and cases with less severe anxiety, on the other. The special signs used to characterize AIs at the upper age levels have been recorded separately and the primitive signs have been strengthened by including only completely primitive serials (Table 3). In view of the severity of the analogous MCT signs,

Table 3

zero phases, we have also judged real AI regressions to be particularly severe. Unfortunately, the number of younger school children was smaller than one might have wished and they are rather unevenly divided by the anxiety symptom scale. In the older age groups we find an increase in the number or severity of anxiety signs as the severity of anxiety increases. Signs of primitive functioning seem to play a prominent role in this correlation, more prominent than the comparatively sparse signs of regression. The difference between cases of severe anxiety, on the one hand, and all other subjects, on the other, emerges very clearly in a statistical test (χ^2 = = 25.83, df = 2, P <0.0005, one-sided test).

Psychotic discontinuity

Signs of regression played a rather marginal role in differentiating between normal and clinical subjects and between subjects with more or less severe anxiety symptoms. One reason was that subjects with regressions were often characterized by other anxiety signs as well (Table 2), another that color regressions had to be excluded for technical reasons pertaining to the normal group. Nevertheless, we wanted to look more closely into the significance of signs of regression, not only as signs of manifest anxiety but, like zero phases in the MCT, as signs of psychotic discontinuity. It has already been demonstrated that AI serials in adult schizophrenics are characterized by regressions and that the probability for regressions to occur increases with the severity of the schizophrenic illness (Smith, Ruuth, Franzén, & Sjöholm, 1972). At the same time, we also wanted to clarify the diagnostic difference between protocols characterized by intermittent regressions to primitive AIs and protocols with nothing but primitive AIs.

In view of the greater likelihood of partial primitive functioning in young and cognitively immature subjects, even normal ones, we decided to limit the analysis to the two older age groups except for the immature 12-13-year-olds. On account of the small number of subjects with regressions we decided to accept $\geq$ 1 real regression as indicative of severe discontinuity and $\geq$ 2 pseudo-regressions as indicative of more marginal

cases (eventually to be included in one single regression group). The difference between the two kinds of regression will be made clear below.

Scoring

Real regression: change from a mature AI to an immature one. i.e., from size $\geq$ 8.0 cm to size $\leq$ 6.5 cm; from negative to positive color; from an AI reflecting the meaning of the stimulus (the AI most often reported as a mere oval, sometimes as a schematic face) to an AI reflecting another, more concrete or physiognomic meaning ("a giraffe", "a laughing face", "a Christmas tree"). For obvious reasons the brightness dimension could not be used for scoring regression. Real regressions should occur from one phase to the next in serials where the initial phase is not primitive.

Pseudo-regression: The first phase is primitive in the same way as the regression phase; and/or one or two phases intervene between the normal phase and the regression phase; and/or the regression occurs "within" one and the same phase.

Completely primitive serials: all phases are constant in size and/or positive.

Results

In order to understand the details of Table 4 the reader is referred back to the MCT scoring categories in the section

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Table 4

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on methods. The intergroup differences can be summarized in the following way. The regression group differs from group 3 with respect to symptoms of paroxysmal anxiety ($P = 0.001$, Fisher's exact test, one-sided) and disturbed reality contact ($P = 0.004$), the primitive group remaining somewhere below the median. Group 3 differs from both the other groups with respect to cronic anxiety ($P = 6 \times 10^{-5}$). The severe anxiety signs in the MCT are most common in the regression group and least common in group 3. The difference is more pronounced with respect to MCT signs of open anxiety ($P = 10^{-4}$), the primitive group

again drawing closer to group 3. A similar trend is true of discontinuity in the MCT whereas eye-shutting behavior tends to be slightly less common in the regression group la than in the other groups, the primitive group in particular.

Comments

The groups thus distinguished by their AI serials have been defined by the clinical symptoms and the MCT signs in the following way. The regression group is characterized by paroxysmal anxiety as well as by many anxiety signs in the MCT ,in-including signs of open anxiety. The presence of discontinuity in the MCT supports the picture of a severely dysfunctional group, clinically often suspected of disturbed contact with reality. This group is accompanied by the primitive group part of the way, but there are fewer signs of rectangular or open anxiety and the disturbed contact with reality does not seem to bear so many near-psychotic characteristics. Another difference, unfortunately not statistically significant in the present small sample is the presence of infantile defense strategies in this group (MCT), strategies the subjects may be able to fall back upon when more mature ones fail them.

Discussion

The existence of significant, often highly significant differences between clinical and normal children and between various subgroups within the clinical group is enough to prove that in the AI test we encounter phenomena which are not spurious or unreliable. The differences seem all the more remarkable in view of the transitory character of most AIs and the difficulty in keeping children, particularly if young and mentally disturbed, to a long and rather tedious task. However, the usefulness of the test does not extend to the preschool level as far as clinical children are concerned. In normal children the technique has been suitable down to an age of 4-5 (Smith & Danielsson, 1977a).

Judging by previous reactions to our publications, many a sincere experimentalist is likely to regard our use of AIs as blasphemous. He often tries to deny results such as those pre-

sented here by saying that they do not really concern AIs as perceptual phenomena but rather the subject´s idiosyncratic way of reporting them or other artefacts resulting from a specific experimental situation. People who deny that AIs can have anything to do with processes beyond the perceiver´s retina obviously have a very particular type of AI in mind, i.e., the AI produced by adults and relatively mature children after sufficient practice in front of a projection screen. This AI can undoubtedly be regarded as a peripheral phenomenon,rather useless for a personality psychologist. The more personal adaptive process leading up to this isolated end-product has been largely ignored by the classical experimentalist as mere error variation.

The present account of personality research based on AIs does not make any claim to completeness. In the introduction we mentioned the use of progressively diminishing AI size to characterize depressive retardation; this theme will be presented in a separate publication (Smith & Danielsson, 1977b). Another AI quality, color variegation, has been regarded as an indication of sensitivity or mild projective tendencies (Smith, Sjöholm, & Nielzén, 1974). The variegation should not allude to the shematic features of the stimulus ("red eyes in a bluish oval") but should be free from narrow stimulus dependence ("the upper half red, the bottom part green", etc). The latter kind of report correlated not only with symptoms of sensitivity but also with signs of sensitivity in the MCT (changes in B while A is still subliminal). A similar correlation has been found in the present material and will be reported in another context.

The diagnostic dimensions treated here are all related to anxiety. Primitive AI stigmata seem to be typical of our anxiety-ridden children, not because they are cognitively retarted but because they prefer to function at levels lagging behind their cognitive development. Their preference for a less advanced and, therefore, less demanding level of functioning is apparently one side of their general strategy to avoid or at least reduce imminent anxiety provocations. The more articulated and advanced the adaptive demands on an individual the greater the risk for such provocations to be actualized and

penetrate into consciousness. As we shall see below, this defensive regression is not made after the same pattern in all individuals and may also be more or less successful as an anxiety reducing strategy.

However, let us first summarize the AI signs of manifest anxiety. Like adults, children and adolescents reveal their anxiety in growing and darkening images. The further down the age and maturity scale the more prominent a dark and black AI becomes as an expression of anxiety at the perceptual level. One reason would apparently be the inveterate tendency of immature AIs to remain size-constant. The regressive reactions in older children were, at the same time, considered as indirect but reliable signs of anxiety as was also the more common tendency in young children to altogether strangle their AI production. We have encountered similar avoidance reactions in adults, particularly adults inclined to entertain all-or-none types of defense (Smith & Sjöholm, 1974a). Considering the clinical children we would rather associate such a reaction with infantile denial and perhaps suggest a developmental link between denial and compulsive defense strategies (cf. Smith & Danielsson, 1977c).

Primitive defenses like denial, and apparently also regression, could be looked upon as simultaneous indications of imminent anxiety because of the transistory, non-structural character of the defense. The anxiety is not encapsulated forever by the defense, only momentarily avoided. In the case of depressive retardation just mentioned the initiating anxiety can often be traced to the over-sized AIs which dominate early phases of the adaptive process. Still, in each new adaptive encounter the anxiety is again quenched by retardation. In the cases of mild obsession in prepuberty mentioned in connection with green images, anxiety seems to have disappeared altogether, perhaps for the benefit of an effective adaption to outside realities before the onset of puberty (cf. Smith & Nordström, 1975). The presence of green defense is not here a sign of anxiety. Instead, the absence of this defense in the corresponding clinical group may probably be taken as a mene tekel.

There was a correlation between discontinuities in the AI process and symptoms of open and paroxysmal anxiety. Regressions to immature AIs and regression to what Cameron (1963) has called primary anxiety are thus registered in the same individuals. Knowing that paroxysmal anxiety, as opposed to neurotic signal anxiety, is likely to be a serious symptom (in subjects as old as ours) we will try to better define the regression group by comparing it with the primitive group. Both groups are no doubt severely disturbed in many ways - but differently. The primitive subjects regress to a rather constant primitive level. They are also slightly more inclined to use infantile defenses in the MCT. The regression group does not seem to be richly endowed with such alternatives. Their regressions are intermittent and temporary and represent no lasting functional alternative; they rather appear as foregin intrusions in a still partly adequate functional pattern. Compared with their infantilized counterparts they are split, some of them well on their way into a schizophrenic development.

An interesting observation in the MCT protocols of three members of the regression group is their very early recognition of the threat, almost at the first pairwise presentation, followed very quickly by a denial of the premature discovery. This extreme sensitivity, as if borne by a constant apprehension of danger, allows the denial to function as a prevention measure rather than a defense. Similar reactions have been observed in early or marginal, often non-regressive cases of schizophrenia (Nyman, 1975).It is instructive, then, to learn that the quick sensitivity is not exclusively a concern for the regression group but has been traced in one or two cases among the primitive subjects (but nowhere else). This may indicate a deeper resemblance between the two groups than was accounted for by the surface difference.

Experimentalists conversant with the relation between deviant AI reactions and eidetic imagery may ask for comments on that matter. The present experiment does not favor the production of eidetic images: long and repeated fixations of a rather simplistic stimulus. An eidetic image is most likely to appear after a brief, "wandering" observation of a variegated and in-

teresting picture. Several children in our groups may have been able to form such images given optimal opportunities. However, there is no good reason to assume that the proportion of eidetic children should differ between the normal and clinical groups and thereby influence the results - which are fully comprehensible anyway in terms of cognitive maturity, anxiety and defense.

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Table 1.

Truncated, size-constant and differently colored AI serials in normal and clinical children

Age/maturity level	No. of AI phases			⩾2 AIs ⩽6.5 cm		⩾2 pos. AIs		No neg.-chrom. AIs		⩾1 green AI	
	No	<8	⩾8	Yes	No	Yes	No	Yes	No	Yes	No
1a + 1b	3[14]	0[2]	0[4]	0[4]	0[0]	0[2]	0[2]	0[4]	0[0]	0[0]	0[4]
2a + 2b + 3a	4[1]	2[5]	1[21]	0[19]	1[4]	1[8]	0[15]	0[14]	1[8]	0[1]	1[22]
3b	0[1]	0[0]	1[6]	0[6]	1[0]	0[2]	1[4]	0[4]	1[2]	0[0]	1[6]
7 - 10(11) imm.	3[2]	1[0]	8[17]	8[7]	0[10]	3[6]	5[11]	3[4]	5[13]	1[5]	7[12]
7 - 10(11) mat.	0[0]	2[1]	13[16]	7[2]	6[14]	2[9]	11[7]	7[4]	6[12]	2[5]	11[11]
12 - 13 imm.	0 -	0 -	3 -	3 -	0 -	3 -	0 -	2 -	1 -	1 -	2 -
(11)12 - 13 mat.	1[0]	1[1]	11[16]	6[1]	5[15]	1[6]	10[10]	6[0]	5[16]	1[10]	10[7]
14 - 16 imm.	0 -	0 -	4 -	2 -	2 -	0 -	4 -	2 -	2 -	2 -	2 -
14 - 16 mat.	0[0]	0[0]	17[19]	8[1]	9[18]	4[6]	13[13]	10[3]	7[16]	1[5]	16[14]

Note: Figures in brackets represent the normal group.

Table 2.

AI signs of anxiety in normal and clinical children

	1 Old anxiety signs	2 The rest prim. signs	3 The rest regres-sions	4 The rest new signs	Σ1 - 4	5 Incom-plete serials	6 Complete serials no anxiety
7 - 10(11) imm.	2 [6]	------	------	4 [2]	6 [8]	4 [2]	2 [9]
7 - 10(11) mat.	10 [5]	------	------	3 [0]	13 [5]	2 [0]	0 [11]
(11)12 - 13 mat.	3 [4]	5 [3]	0 [0]	0 [0]	8 [7]	1 [1]	3 [9]
14 - 16 mat.	6 [5]	4 [4]	1 [0]	0 [1]	11 [10]	0 [0]	6 [9]

Note: Figures in brackets represent the normal group.

Table 3.

AI signs of anxiety and severity of anxiety symptoms.

Anxiety signs	7-10(11) imm.			7-10(11) mat.			12 - 16 imm.			(11)12-16 mat.		
in AI	Se	Mi	No	Se	Mi	No	Se	Mi	No	Se	Mi	No
Truncated serials	1	2	2	2	0	0	0	0	-	1	0	0
Dark/large AIs	1	5	8	9	3	5	1	2	-	11	2	10
Only size-constant		———			———			———		3	0	0
Only pos. ± achrom.		———			———			———		5	0	0
Real regr.		———			———			———		5	0	0
≥2 signs or regr.		———			———			———		10	0	0
1 sign, no regr.	1	4	8	9	3	5	1	2	-	7	2	10
No sign	0	2	7	0	2	2	1	6	-	3	6	26

Note: Se = severe anxiety, Mi = mild anxiety, No = normal group.

Table 4.

Descriptions be means of symptoms and MCT data of three AI groups among adolescent clinical subjects.

AI groups in subjects (11)12-13 mat and 14-16.	Clinical variables						MCT variables									
	Paroxys. anxiety		Chronic anxiety		Disturbed real.	cont.	Severe anxiety signs ≥3	2	<2	Open anxiety		Discont-inuity		Eye-shutting behavior	
1a ≥1 real regr.	4	1	5	0	4	1	2	1	2	4	1	4	1	1	4
1b ≥2 pseudo-regr.	2	1	3	0	2	1	2	1	0	3	0	1	2	2	1
Σ 1	6	2	8	0	6	2	4	2	2	7	1	5	3	3	5
2. Primitive	2	6	8	0	5	3	0	4	4	2	6	2	6	6	2
3. The rest	1	16	6	11	2	15	0	2	15	1	16	2	15	7	10

Note: If not otherwise stated, figures to the left in a column represent the presence of a sign as defined in the text, figures to the right, its absence.